Analele Universităţii din Craiova, seria Agricultură – Montanologie – Cadastru (Annals of the University of Craiova - Agriculture, Montanology, Cadastre Series) Vol. XLVII 2017

STUDIES ON THE USEFUL ENTOMOFAUNA IN SOME VEGETABLE CROPS IN SOUTH OF OLTENIA

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keywords: useful entomofauna, vegetable products

ABSTRACT

Vegetable crops have been the most important technological group that is grown in our country. Due to their multiple importance, vegetable crops have received increased attention both from the scientific and technical point of view.

In our country, research on useful entomofauna began after 1929, when the first entomology research unit was set up, namely the "Entomology Station" within the Institute of Agronomic Research in Romania (Institutul de Cercetări Agronomice din România - I.C.A.R.).

This paper aims to bring a great contribution of scientific data regarding useful entomofauna.

The research has been conducted in the private stationary unit in Amărăştii de Jos, using
three methods of collecting the entomofauna and namely the Barber type soil trap, the frappage method and method of capture by using the entomological net.

All the entomofauna collected from the vegetable ecosystem has been subjected to detailed analyzes of the systematic group to which each species belongs.

The research has identified 390 species belonging to 7 orders with 15 families.

Most species belong to the Scarabaeidae families (5 species), followed by the Chrysomelidae family with 4 species, the Acrididae, Aphididae, Pentatomidae, Cetoniidae, Pieridae and Noctuidae families, each with 3 species, with the rest of the families having 1-2 species.

INTRODUCTION

Almost all the nutrients the body needs every day are found in vegetables. They do not contain cholesterol and fats, which is why they are safe even for people who are on a slimming diet.

In our country, research on entomofauna encountered in vegetable species was carried out by Bobîrnac B. and Matei Iulia 1983, Roman T. and Neamţu Maria, 2000, Costache M., Roman T., 2001, Mitrea et al. 2002, Georgescu T., et al., 2003, Tălmaciu M., et al., 2004, Rotari Elena, et al, 2011, etc.

In this region, research on the entomofauna has been carried out by Bobîrnac, Matei Iulia 1985, Costescu and Mitrea, 1989, Mitrea et al. 2002, Mitrea, 2013, etc.

The researches took place in Dolj county, in the private stationary unit in the village Amărăştii de Jos, where vegetables are grown on large surfaces and with rich crops.

Knowledge of useful insects has been of particular interest in maintaining harmful populations below the economic threshold of harm, so useful species are very susceptible and vulnerable to pesticides, and their disappearance would lead to the destruction of the existing balance between the different biosystems in agrobiocenoses.

MATERIAL AND METHODS

The present paper aims to bring in the scientific data obtained from the research on the useful entomofauna and the vegetable crops in southern Oltenia, research carried out around the area of Amărăştii de Jos village - Dolj County.

In 2016, three methods of entomofauna collection were used (the Barber's type soil trap, the frappage method and method of capture with the entomological net), under production conditions.

Samples were periodically collected, depending on the course of crop growing, but also on the research method.

The stationary units considered for the study consisted in 6 traps on a line of plants from the edge to the inside in a straight line at a distance of 20 m from the edge and 6 to 8 m between traps per row.

For the Barber method, plastic boxes were used, with a volume of 500 ml, with a 10 cm diameter and an 8 cm height, and the securing fluid used was a salt solution with a concentration of 25%.

The material collected was brought to the entomology laboratory within the Faculty of Horticulture and determined using a magnifying glass and specialised determining devices: *Bobîrnac B. et al. 1994, Stănoiu I. Năstase A, 1998, Chimişliu Cornelia,* 2002 and 2005 *etc.*

The entomofauna collected from the vegetable ecosystem has been subjected to detailed analyzes of the systematic group to which each species belongs.

The useful species have been selected from all the species identified and treated separately.

The representatives have been identified and sorted by families and order up to a level of species.

RESULTS AND DISCUSSION

In 2016, the results obtained from some vegetable crops regarding the structure of the entomofauna in southern Oltenia included the identification of 63 harmful and useful species belonging to the **Insecta** class, totaling 590 specimens collected. (Table 1)

The collected insects were systematically classified in 10 orders (*Orthoptera* – 6 species, *Homoptera* – 3 species, *Hetroptera* – 3 species, *Hymenoptera* – 6 species, *Thysanoptera* - 1 species, *Odonata* – 3 species, *Mecoptera* – 1 species, *Coleoptera* – 26 species, *Lepidoptera* - 9 species and *Diptera* – 5 species belonging to 28 families).

After analyzing the data obtained regarding the structure of the entomofauna collected from some vegetable crops in southern Oltenia, the stationary unit Amărăştii de Jos, it is evident that in this region the largest share of 41% is held by the *Coleoptera* order, followed by the *Lepidoptera* order (14%), *Orthoptera* and *Hymenoptera* orders, each with a share of 9%, the *Diptera* order with 8%, *Odonata* order with 4%, *Homoptera* and *Hetroptera* with 5% each, and ranking last are *Thysanoptera* and *Mecoptera* orders with 1-2% (Fig.1).

Regarding the structure of the species collected per families, it can be noticed that the largest number of species belongs to the *Carabidae* family (7 species), *Scarabaeidae* (5 species), followed by *Coccinellidae and Chrysomelidae* families with 4 species, *Curculionidae* with 4 species, *Acrididae, Aphididae, Aphididae, Pentatomidae, Apidae, Vespidae, Cetoniidae, Pieridae, Noctuidae* families with 3 species each, with the rest of the families having 1-2 species. (Fig.2)

Table 1

Structure of the species collected in some vegetable crops in 2016 (Amărăştii de Jos stationary unit - Dolj County)

No.	Order	Family	Species name	Abundance
1	**Orthoptera**	Gryllotalpidae	*Gryllotalpa gryllotalpa*	5
2		Gryllidae	*Gryllus campestris L*	8
3			*Gryllus desertus L*	10
4		Acrididae	*Acrida hungarica* Herbst	8
5			*Dociostaurus maroccanus* Thunberg	9
6			*Callipta musitalicus* L.	6
7	**Homoptera**	Aphididae	**Brevicorine brassicae L.*	-
8			**Myzodes perisicae*	-
9			**Aphis fabae*	-
10	**Hetroptera**	Pentatomidae	*Graphysoma lineatum L*	9
11			*Eurydema ornate L*	10
12			*Eurydema oleraceae L*	8
13	**Hymenoptera**	Apidae	*Bumbus terrestris*	7
14			*Apis melifera L.*	7
15			*Xilocopa violaceae* L.	9
16		Vespidae	*Vespa vulgaris L*	10
17			*Vespa germanica L*	12
18			*Vespa crabro L*	8
19	**Thysanoptera**	Thripidae	*Frankliniella occidentalis* Pergande	6
20	**Odonata**	Calopteridae	*Clopterix splendens (Harris)*	5
21		Libellulidae	*Libelula depresa L*	4
22		Coenagrionidae	*Cornagrion pulchellum (libeluls)*	6
23	**Mecoptera**	Panorpidae	*Panorpa communis L.*	1
24	**Coleoptera**	Chysomelidae	*Leptinotarsa decemlineata*	23
25			*Cassida nebulosa L.*	3
26			*Phyllotreta atra L.*	12
27			*Phyllotreta nemorum L.*	16
28		Cantharidae	*Canthars fusca L*	3
29		Carabidae	*Harpalus affinis* Schrank	14
30			*Carabus violaceus*	12
31			*Carabus ulrichi*	12
32			*Carabus cancellatus*	8
33			*Calosoma sycophanta*	6
34			*Amara crenata*	12
35			*Pterostichus nigera*	11
36		Coccinelidae	*Adalia bipunctata*	11
37			*Coccinella septempunctata*	14
38			*Adonia variegata*	7
39			*Coccinella 12-punctata*	10
40		Elateridae	Agriotes lineatus L	6
41			Agriotes ustulatus L	8
42		Scarabaeidae	*Melolontha melolontha L.*	9
43			*Anoxia vilosaFabr.*	9
44			*Rhizotrogus aeqinoctialis*	8
45			*Polyphylla fullo L.*	10
46			*Oryctesna sicornis*	4
47		Cetoniidae	*Tropinota (Epicometis)hirta*Poda,	8
48			*Oxythyrea funesta*(Poda	7
49			*Cetonia aurata L*	5
50	**Lepidoptera**	Pieridae	*Pieris Brassicae L.*	16
51			*Pieris rape L.*	14
52			*Pieris napi L.*	16
53		Noctuidae	*Mamestra brassicae L.*	13

54			*Autographa gamma L.*	11
55			*Helicoverpa armigera Hbn.*	15
56		Lycaenidae	*Lycaena phleas L*	3
57		Sphingidae	*Daphnis nerii L.*	4
58		Nymphalidae	*Arginis paphya*	5
59	**Diptera**	Antonomyidae	*Delia brassicae Bché*	8
60			*Delia antiquaMeig.*	5
61		Heliomyzidae	*Suilli aluridaMeig.*	6
62		Tabanidae	*Tanbanus spp. L.*	1
63		Culicidae	*Culex spp. L*	1
No. Specimens collected				590

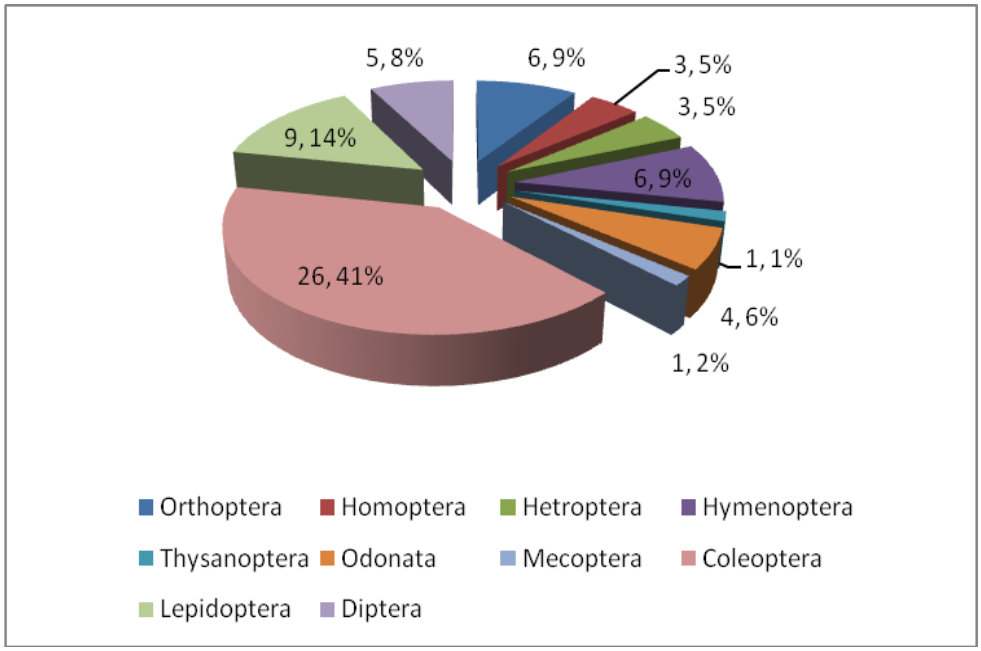

Fig. 1. Structure of entomofauna collected from some vegetable crops from Amărăştii de Jos Stationary Unit - Dolj

Of the total number of species collected within the studied vegetable ecosystem, it was found that: *37 are harmful*, ***14 are useful*** and *12 are indifferent* to this crop but may be harmful to other crop plants or other spontaneous flora (encountered as weeds).

The analysis of the number of useful species collected from some vegetable crops in the Amărăştii de Jos area shows that the 14 species belong systematically to 2 orders and three families as follows: the *Hymenoptera* order with the *Apidae* family with 3 species and the *Coleoptera* order with 2 families: *Carabidae* with 7 species and *Coccinelidae* with 3 species (Table 2).

Regarding the abundance of useful species collected per order, it is observed that the **Coleoptera** order has 11 species, the **Hymenoptera** order is recorded with only 3 species.

The analysis of the abundance of useful species in some vegetable crops shows that the species *Harpalu saffinis, Coccinella septempunctata* had the highest number of specimens collected, (14) followed by *Carabus violaceus, Carabus ulrichi* and *Amara crenata* (each with 12 specimens).

Table 2

Structure of the useful species collected in some vegetable crops in 2016 (Amărăştii de Jos Stationary Unit - Dolj County)

No.	Order	Family	Species name	Abundance
1	**Hymenoptera**	Apidae	*Bumbus terrestris*	7
2			*Apis melifera L.*	7
3			*Xilocopa violaceae* L.	9
4	**Coleoptera**	Carabidae	*Harpalus affinis Schrank*	14
5			*Carabus violaceus*	12
6			*Carabus ulrichi*	12
7			*Carabus cancellatus*	8
8			*Calosoma sycophanta*	6
9			*Amara crenata*	12
10			*Pterostichus nigera*	11
11		Coccinelidae	*Adalia bipunctata*	11
12			*Coccinella septempunctata*	14
13			*Adonia variegata*	7
14			*Coccinella 12-punctata*	10

Pterostichus nigera and *Adalia bipunctata* had 11 specimens each, *Coccinella 12-punctata* had 10 specimens, *Xilocopa violaceae* L. had 9 specimens, *Carabus cancellatus* had 8 specimens, *Bumbus terrestri* and *Apis melifera L* had 7 specimens each. The lowest number of individuals collected, namely 6, belong to the *Calosoma sycophanta* species (*fig. 2).*

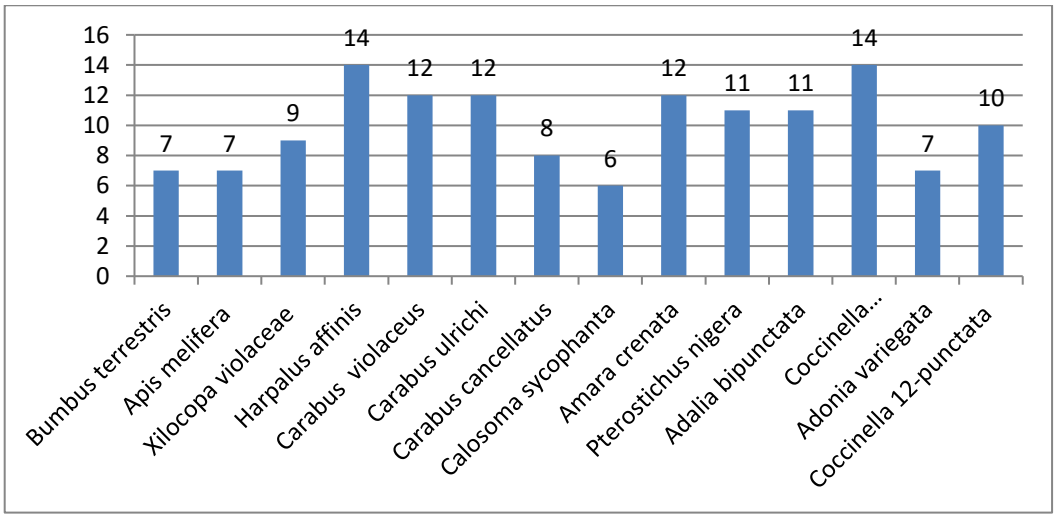

Fig.2. The structure of useful species collected belonging to the 2 orders identified from some vegetable crops in Amăraştii de Jos area

The analysis of the abundance of useful species falling under the *Hymenoptera* order shows that the *Aidae* family has 2 species (*Bumbus terrestris, Apis melifera L.*) each with 7 specimens, and the third species (*Xilocopa violaceae* L.) had 9 specimens (fig.3).

From the analysis data on the abundance of useful species included in the *Coleoptera* order (*Carabidae* family, collected and identified from some vegetable crops, it results that the species *Harpalus affinis* had the biggest share with 14 specimens, followed by the species *Carabus violaceus, Carabus ulrichi* and *Amara crenata* each with 12 specimens, *Pterostichus nigera* with 11 specimens.

Some places are held by the species *Carabus cancellatus* and *Calosoma sycophanta* each with 8, and 6 specimens, respectively (fig.4).

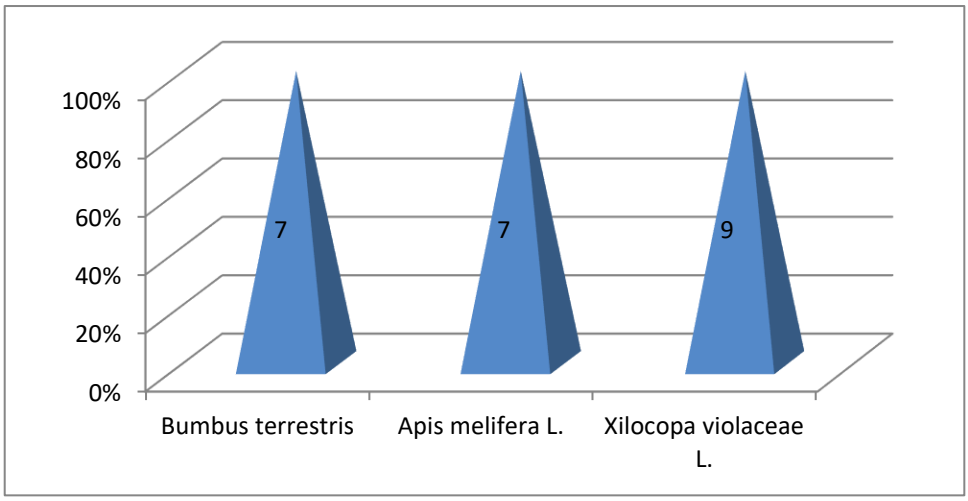

Fig.3. Useful Hymenoptera in the Apidae family collected and identified from some vegetable crops in the Amărăştii de Jos - Dolj area

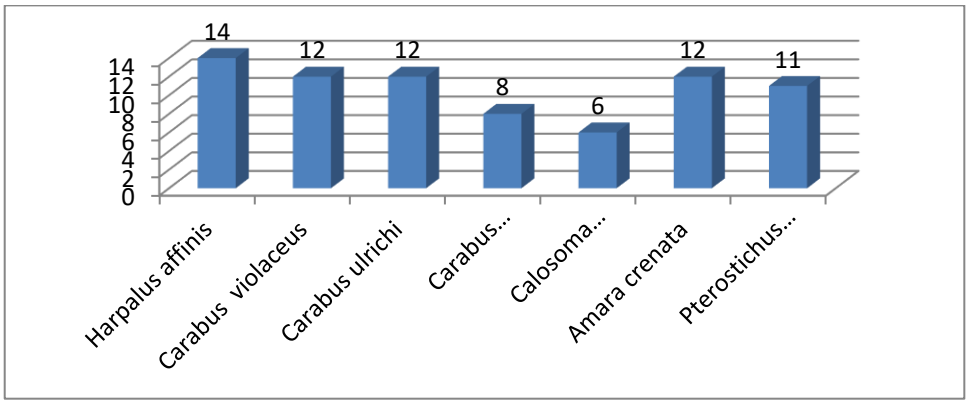

Fig.7 Useful Coleoptera in the Carabidae family collected and identified from some vegetable crops in the Amărăştii de Jos - Dolj area

The *Coccinelidae* family presented a number of 4 useful species collected from some vegetable crops, the highest share was held by the *Coccinella septempunctata* species with 14 specimens, followed by *Adalia bipunctata* with 11 specimens, *Coccinella 12- punctata* with 10.

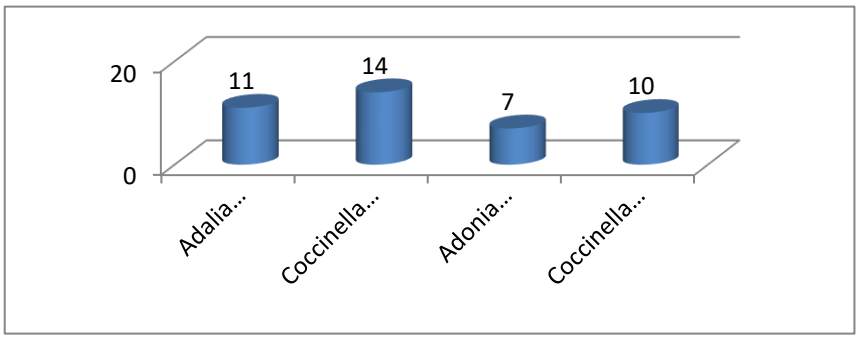

Fig.12 Useful Coleoptera in the Coccinelidae family collected from some vegetable crops in the Amărăştii de Jos - Dolj area

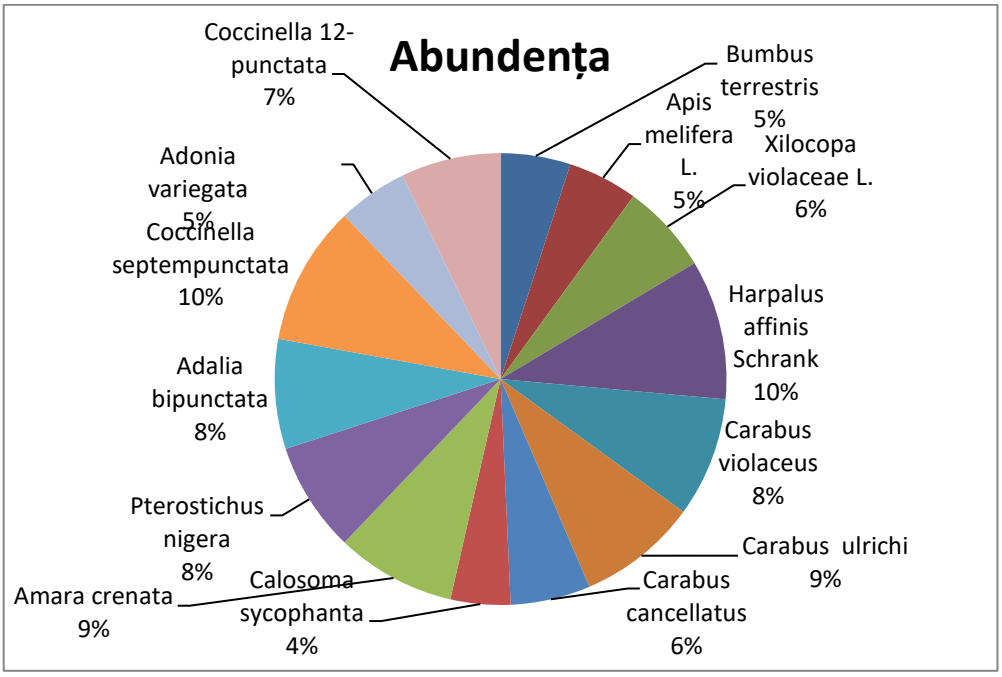

Fig.15 The share of useful species collected from some vegetable crops in the Amărăştii de Jos - Dolj area

The largest share is held by the species *Harpalus affinis Schrank* and *Coccinella septempunctata* each with 14 representatives, followed by the species *Carabus violaceus, Amara crenata* and *Carabus ulrichi* with 12 representatives, *Pterostichus nigera and Adalia bipunctata* with 11 representatives each.

The species *Coccinella 12- punctata (10), Xilocopa violaceae L (9), Carabus cancellatus (8)* have the fewest representatives*, Apis melifera* and *Bumbus terrestris and Adonia variegata* with 7 representatives each and the last species *Calosoma sycophanta* with 6.

CONCLUSIONS

Useful entomofauna can serve as indicators for solving problems, their frequency in certain ecosystems or why not as mathematical models of the dynamics of some animals of economic interest.

The entomofauna identified so far in southern Oltenia belongs to 28 families and 10 orders.

The useful species collected from some vegetable crops in the Amărăştii de Jos area belong systematically to 2 orders with 3 families, as follows: the *Hymenoptera* order - the *Apidae* family with 3 species and the *Coleoptera* order with two families: *Carabidae* with 7 species and *Coccinelidae* with 4 species (tables 2 and Fig. 2), totaling 14 species.

The highest share is held by the species *Harpalus affinis Schrank* and *Coccinella septempunctata* - species of 14 specimens each, belonging to the *Carabidae* and *Coccinelidae* families, the last of which is the *Calosoma sycophanta* species with 6 specimens, a species belonging to the *Carabidae* family - the *Coleoptera order.*

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